

### REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 to 5, 7 to 18 and 23 to 26.

The above amendment makes a minor and self-explanatory correction to claims 23 to 26.

The claims have been rejected as unpatentable over Miyamoto.

This rejection is respectfully traversed.

The present claims relate to an ink jet recording material comprising a support, at least one recording layer on said support, which recording layer contains colloidal particles and a water soluble resin and the recording having a specified pore diameter distribution curve.

Claims 3 to 5, 12 to 17, 22, 23 and 25 recite the use of colloidal silica in the recording layer.

The instant high gloss ink jet recording material exhibits a high ink absorption rate, provides a high print density and shows good water resistance, ink-fixability and printability, as pointed out on page 13, lines 10 to 13 of the present specification.

Miyamoto, as pointed out in the previous response, relates to a process for producing recording papers such as an ink jet recording paper and discloses in column 3, line 59 the use of colloidal silica as an inorganic fine powder.

The colloidal silica employed by Miyamoto in the working examples is "Vitasil 1500".

An English translation of the catalog of the "Vitasil" and a copy of the catalog are attached herewith.

"Vitasil 1500" was manufactured by Taki Kagaku Co., Ltd., from 1965 to 1982. However, the manufacture of the "Vitasil 1500" ceased in 1982.

Thus, it is not possible to directly compare the presently recited colloidal silica with Vitasil 1500.

Nevertheless, in order to demonstrate that unexpected properties, i.e. a high gloss, cannot be obtained with "Vitasil 1500" employed in the examples of Miyamoto, the following should be noted.

As is apparent from the attached English translation of the "Vitasil" catalog, "Vitasil 1500" is not a colloidal particle and the secondary particles thereof are almost white carbon. Thus, in the English translation of the catalog at page 4, the photograph of "Vitasil 1500", which is not colloidal, is depicted.

Moreover, it is disclosed in paragraphs (5)-(1) and 7-(5) of the catalog, that "Vitasil 1500" exhibits a matting effect, and it is disclosed in the table of the catalog that the average particle size of the "Vitasil 1500" is  $18\mu$  which is much larger than the presently recited colloidal particles, e.g. a few hundred nm.

Accordingly, it is apparent that high gloss cannot be obtained by "Vitasil 1500" containing material of Miyamoto, in contrast to the colloidal particle containing recording material of the present claims. Thus, there is no concrete teaching in Miyamoto to employ colloidal silica and particularly the particle sizes recited in claims 2 to 5, 10, 13 and 21.


For the foregoing reasons, the rejection on Miyamoto is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

Bo LIU et al.

By:   
Matthew Jacob  
Registration No. 25,154  
Attorney for Applicants

MJ/pjm  
Washington, D.C. 20006-1021  
Telephone (202) 721-8200  
Facsimile (202) 721-8250  
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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### IN THE CLAIMS:

*Claims 23 to 26 have been amended as follows:*

23. (Amended) [An] The ink jet recording material according to claim 2, wherein said colloidal particles are colloidal silica.

24. (Amended) [An] The ink jet recording material according to claim 2, further comprising a sticking or adhesive interlayer on said support;

wherein the laminate of said support, said interlayer and said recording layer are obtained by a process which comprises forming said interlayer on said support, superposing said interlayer on a recording layer formed on a forming material, and then peeling said forming material off said recording layer.

25. (Amended) [An] The ink jet recording material according to claim 24, wherein said recording layer contains at least one of an amorphous silica or colloidal silica.

26. (Amended) [An] The ink jet recording material according to claim 24, wherein said interlayer contains at least one selected from the group consisting of thermoplastic resin, adhesive and pressure-sensitive adhesive.



High Performance White Carbon

Vitasil

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TC 1700 MAIL ROOM

Taki Kagaku Co., Ltd.

Head office; Telephone number (0794)37-2111, 〒675-01, 2,  
Midori-cho, Betppu-cho, Kakogawa-shi, Hyogo-ken

Tokyo office; Telephone number (03)541-2775, 〒104, 4, 14,  
7-chome, Ginza, Chuo-ku, Tokyo-to

Osaka branch; Telephone number (06)345-3864, 〒530,  
Shinhanshin build. 25, 2, 2, Umeda, Kita-ku, Osaka-shi

## High Performance White Carbon

### V Vitasil

#### [Introduction]

Various chemical industries such as polymer chemical industry have been noticeably developed. Accordingly, a reinforcing agent, a filler and an assistant used for these various chemical industries are recently increasingly required to have high performance.

Vitasil is white carbon having high performance produced by an original technique of our company. This product has been produced by the investigation from the standpoint of respective users and, therefore, has much excellent properties compared with other similar kind of products.

Accordingly, Vitasil is now being used as a reinforcing filler for various rubbers, and also being used for agricultural chemicals, synthetic resins, dyes and other various uses. Thus, Vitasil is remarkably popular among users.

#### [Brand and property]

Vitasil is an amorphous ultra-fine powder silicic acid of silicic dioxide having bonding water ( $\text{SiO}_2 \cdot n\text{H}_2\text{O}$ ), and main brands and properties thereof are shown in a separate table.

[Use]

1) Rubber

Vitasil imparts great reinforcing property to various synthetic rubbers and natural rubbers. Further, Vitasil improves tensile resistance, modulus, hardness, resilience, wear resistance, bending resistance, etc. of a compound rubber. In particular, it exhibits remarkably excellent reinforcing effects for synthetic rubbers.

Generally, as essential conditions of a rubber reinforcing agent, the following properties can be mentioned.

(1) Particles are extremely small and uniform.

(2) Interface affinity is strong and wetting property is good.

(3) Mass is not formed in the rubber so that the complete dispersion of the agent may be achieved.

(4) Accelerator is not adsorbed to the agent and vulcanization can proceed smoothly.

Since Vitasil is excellent in these properties, it can be readily dispersible in rubber so that kneading procedure thereof can be effected readily and swiftly. Particularly, Vitasil can exhibit excellent performances in wear resistance, hardness, modulus and transparency.

## 2) Agricultural chemical

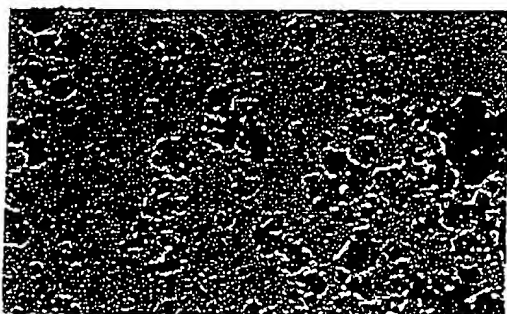
In a case where Vitasil is used for an agricultural chemical,

(1) Vitasil exhibits excellent ability as an adsorbing agent of the agricultural chemical original body owing to its high oil absorption ability, and prevents the decomposition of the original body with an appropriate pH to show an excellent stability with time;

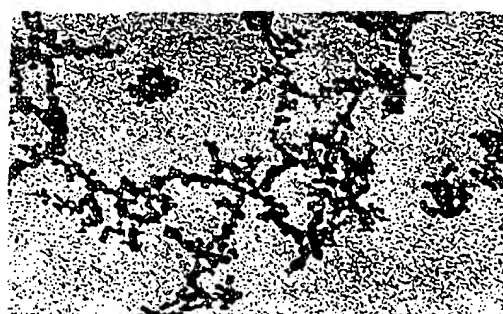
(2) in a case where Vitasil is used in the form of a powdered agent, it prevents the agricultural chemical from solidification and facilitates the spreading of the same;

(3) in a case where Vitasil is used for an emulsifier or a hydration agent, it imparts chinning ability to the agents, which results in the prevention of the agents from settling and the improvement of the same in spreading ability.

Electron photomicrograph of Vitasil



Vitasil #550 x 60,000



Vitasil #1500 x 60,000

3) In a case where Vitasil is used in paper production,

(1) it is useful for improving rheological properties of a coating material of a paper;

(2) it prevents strike-through in a paper for newspaper.

#### 4) Plastics

In a case where Vitasil is compounded to produce a molded article, Vitasil can exhibit properties as set forth below.

(1) It can improve physical strength of a product.

(2) It can clean up the surface of a product so as to enhance the effects obtained by a pigment.

(3) It can increase the heat resistance and the chemical resistance of a product.

(4) It can reduce an exotherm at a time of molding to facilitate processing.

Vitasil shows excellent properties as a filler for various resins, particularly, polyester, melamine, epoxy, uria, polyethylene and phenol.

#### 5) Paint and print ink

When Vitasil is used, the following effects can be obtained.

(1) Vitasil can exhibit grace and beautiful matting effect which cannot be obtained with titanium white or calcium carbonate.

(2) Vitasil is useful for preventing a pigment from settling.



(3) Vitasil imparts viscosity to a paint or an ink and, therefore, effective in preventing the same from sagging.

(4) Vitasil provides uniformity in coating.

#### 6) Adhesive

The use of Vitasil increases viscosity of various aqueous or solvent-based synthetic resin adhesives, prevents the same from peeling after being adhered and increases adhesion after setting.

#### 7) Others

Vitasil is used for various purposes as described below.

(1) It is mixed with vinyl chloride to improve electrical insulating quality thereof.

(2) It prevents a lake pigment from solidification.

(3) It is added to cod-liver oil or castor oil.

(4) It forms a perfume in the form of powder or gel.

(5) It is applied to white matting electric bulb to prevent the decrease in luminance.

(6) It is used as an emulsifier of cosmetics.

(7) It is useful for improving quality of fibers.

(8) It is used as a shaping agent of remedies.

(9) It gives non-slip effect to wax.

(10) It gives thermal resistance to grease.

(11) It is used as a heat insulation agent.

(12) It is used as a carrier of a catalyst.

[Brand and Property]

1) Physical property

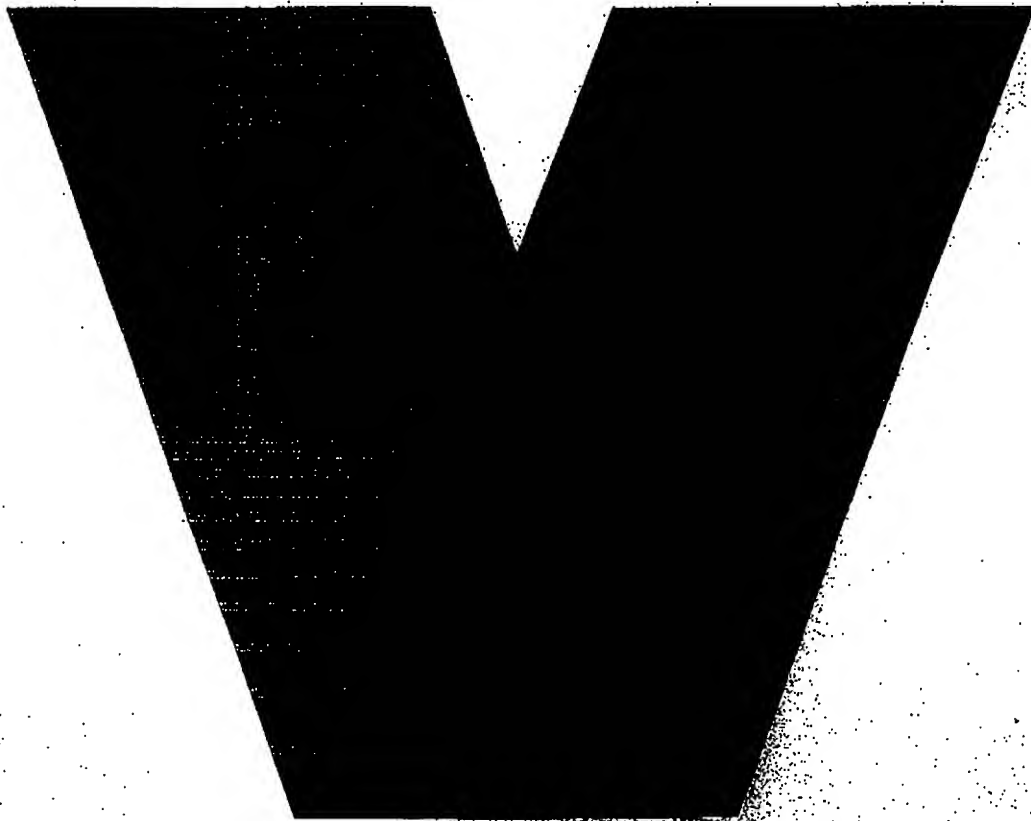
Brand Property	Vitasil #220	Vitasil #250	Vitasil #550	Vitasil #1500	Vitasil #1510	Vitasil #1600
State	White ultra fine powder	White ultra fine powder	White ultra fine powder	White ultra fine powder	White ultra fine powder	White ultra fine powder
True specific gravity	1.95	1.95	1.95	1.95	1.95	1.95
Apparent specific gravity (g/ml)	0.23 ~ 0.26	0.24 ~ 0.27	0.22 ~ 0.25	0.22 ~ 0.26	0.26 ~ 0.30	0.20 ~ 0.24
Average particle diameter ( $\mu$ )	30	30	25	18	20	20
Oil absorption amount (ml/100g)	180 ~ 220	180 ~ 220	180 ~ 220	200 ~ 240	170 ~ 210	230 ~ 270
Specific surface area ( $\text{m}^2/\text{g}$ )	150 ~ 200	70 ~ 120	250 ~ 300	180 ~ 230	180 ~ 230	180 ~ 230
Remaining part after sifting	0.5% or less (74 $\mu$ )	0.5% or less (74 $\mu$ )	0.5% or less (74 $\mu$ )	0.5% or less (44 $\mu$ )	0.5% or less (44 $\mu$ )	0.5% or less (44 $\mu$ )

# 1) Chemical property

Brand Property	Vitasil #220	Vitasil #250	Vitasil #550	Vitasil #1500	Vitasil #1510	Vitasil #1600
PH (5% suspension )	8.0 ~ 9.0	9.5 ~ 10.5	6.5 ~ 7.5	6.0 ~ 7.0	6.0 ~ 7.0	5.0 ~ 6.0
Liberated water* (%)	6 ~ 9	6 ~ 9	6 ~ 9	6 ~ 9	6 ~ 9	6 ~ 9
Weight loss by intensive heating (%)	4 ~ 7	4 ~ 7	4 ~ 7	4 ~ 6	4 ~ 6	4 ~ 6
SiO <sub>2</sub> (%)	81 ~ 85	80 ~ 84	81 ~ 85	84 ~ 88	84 ~ 88	84 ~ 88
CaO (%)	0.2 or less	0.2 or less	0.2 or less	0.1 or less	0.1 or less	0.1 or less
Fe <sub>2</sub> O <sub>3</sub> (%)	0.1 or less	0.1 or less	0.1 or less	0.05 or less	0.05 or less	0.05 or less
Al <sub>2</sub> O <sub>3</sub> (%)	1.0 Or less	1.0 or less	1.0 or less	0.5 or less	0.5 or less	0.5 or less
Na <sub>2</sub> O (%)	4.0 or less	4.0 or less	4.0 or less	1.0 or less	1.0 or less	1.0 or less

\* water content in wrapping

# 高性能ホワイトカーボン ビタニール



多木化学株式会社

本社 兵庫県加古川市別府町緑町2-1 電話 (0794) 37-2111  
東京事務所 東京都中央区銀座7丁目14番4号 電話 (03) 541-2775  
大阪出張所 大阪市北区梅田2-2-25 新阪神ビル 電話 (06) 345-3864

## 高性能ホワイトカーボン

# V ビタシール

### 〔概 説〕

高分子化学工業をはじめとする各種化学工業の発展はまことにめざましいものがあります。従ってこれら各種化学工業に用いる補強剤・充填剤および助剤には最近ますます高性能が要求されつつあります。

ビタシールは弊社が独自の技術により完成した高性能を有するホワイトカーボンです。しかもそれぞれの需要家各位の立場より研究しましたので、他の同種製品の追随を許さないすぐれた特徴をもっています。

従って、ビタシールは現在各種ゴムの補強充填剤をはじめとして、農薬・合成樹脂・塗料その他広範な用途に使用されて、非常なご好評をいただいております。

### 〔銘柄および性質〕

ビタシールは結合水を有する二酸化珪素 ( $\text{SiO}_2 \cdot n\text{H}_2\text{O}$ ) の非晶質超微粉末珪酸で主なる銘柄およびその性質は別表のとおりです。

### 〔用 途〕

#### 1) ゴ ム

ビタシールは各種合成ゴムおよび天然ゴムに対して大きな補強性を与え、配合ゴムの抗張力・モジュラス・硬度・弾性・摩耗抵抗・屈曲抵抗等の

物理的性質を改善し、とりわけ合成ゴムに対しては非常に優秀な補強効果を示します。

一般にゴム補強充填剤の持つべき条件としては下記の性質があげられます。

- (1) 粒子がきわめて小さく、均一であること。
- (2) 界面親和力が強く、湿潤性の良いこと。
- (3) ゴム中で集塊を作らず、完全に分散すること。
- (4) 促進剤を吸着せず、加硫が円満に行われること。

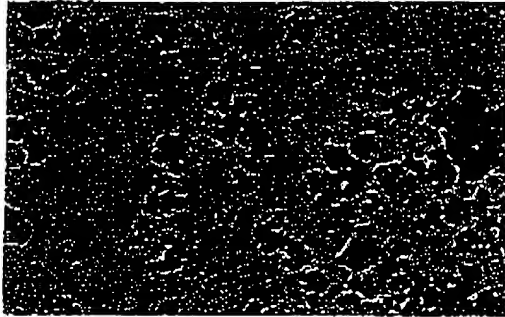
ビタシールはこれらの点にすぐれているので、ゴムに分散しやすく練込作業は容易かつ迅速に行われ、特に耐摩耗性・硬度・モジュラス・透明性においてすばらしい性能を発揮します。

#### 2) 農 薬

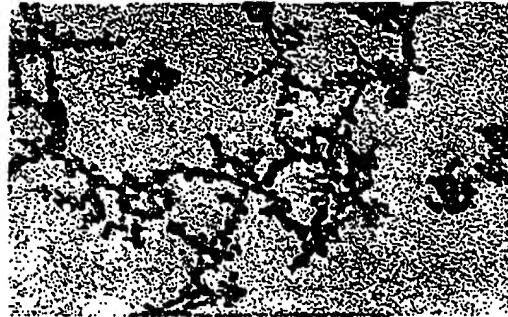
ビタシールを農薬に用いると

- (1) 高い吸油能により農薬原体の吸着剤として秀れた能力を示し、適当なPHにより原体の分解をおさえ、優秀な経時安定性を示す。
- (2) 粉剤として使用する場合、薬剤の固結を防止し、撒布性を良くする。
- (3) 乳剤・水和剤に使用する場合薬剤に懸垂性を与え、沈降を防ぐと共に展着性を向上させる。

## ビタシール電子顕微鏡写真



ビタシール #550×60,000



ビタシール #1500×60,000

## 3) 紙

ビタシールを製紙関係に用いると

- (1) 製紙コート材のレオロジー性の改良に役立つ。
- (2) 新聞用紙のストライクスルーを防止する。

## 4) プラスチックス

ビタシールを配合して成型品を製造する場合には次のような特性を発揮します。

- (1) 製品の物理的強度を向上させる。
- (2) 製品の表面を美化し、顔料の効果を助ける。
- (3) 製品の耐熱・耐薬品性を増大させる。
- (4) 成型時の発熱量を低下させ、加工を容易にする。

ビタシールは特にポリエステル・メラミン・エポキシ・ユリア・ポリエチレン・フェノール等各種樹脂の充填剤として優秀な性質を示します。

## 5) 塗料および印刷インキ

ビタシールを用いると次のような効果があります。

- (1) チタン白や炭カルでは得られない上品な美しい艶消し効果を示す。
- (2) 顔料の沈降防止に役立つ。
- (3) 塗料やインキに粘性を与えタレ止めに効果がある。
- (4) 塗布の均一性を与える。

## 6) 接着剤

ビタシールを用いると各種水性あるいは溶剤性合成樹脂接着剤の粘度を高め、接着後の剝離を防止且つセット後の接着力を増加します。

## 7) その他

ビタシールは次のように、種々の用途に用いられます。

- (1) 塩化ビニールに混じて電気絶縁性を向上させる。
- (2) レーキ顔料の固結を防止する。
- (3) 肝油やヒマシ油に添加する。
- (4) 粉末あるいはゲル状香料を造る。
- (5) 白色艶消し電球に使用し、輝度の低下を防ぐ。
- (6) 化粧品乳化剤として使う。
- (7) 繊維の品質改善に役立つ。
- (8) 医薬品の賦型剤に使う。
- (9) ワックスにスベリ止め効果を与える。
- (10) グリースに耐熱性を与える。
- (11) 断熱剤として用いる。
- (12) 触媒の担体として用いる。

## 〔銘柄および性質〕

## 1) 物理的性質

銘柄 性質	ビタシール #220	ビタシール #250	ビタシール #550	ビタシール #1500	ビタシール #1510	ビタシール #1600
状態	白色超微粉末	白色超微粉末	白色超微粉末	白色超微粉末	白色超微粉末	白色超微粉末
真比重	1.95	1.95	1.95	1.95	1.95	1.95
充填比量 (g/ml)	0.23~0.26	0.24~0.27	0.22~0.25	0.22~0.26	0.26~0.30	0.20~0.24
平均粒子径 (nm)	30	30	25	18	20	20
吸油量 (ml/100g)	180~220	180~220	180~220	200~240	170~210	230~270
比表面積 (m <sup>2</sup> /g)	150~200	70~120	250~300	180~230	180~230	180~230
結晶分	0.5%以下 (74μ)	0.5%以下 (74μ)	0.5%以下 (74μ)	0.5%以下 (44μ)	0.5%以下 (44μ)	0.5%以下 (44μ)

## 2) 化学的性質

銘柄 性質	ビタシール #220	ビタシール #250	ビタシール #550	ビタシール #1500	ビタシール #1510	ビタシール #1600
PH (5%懸濁液)	8.0~9.0	9.5~10.5	6.5~7.5	6.0~7.0	6.0~7.0	5.0~6.0
遊離水分 <sup>※</sup> (%)	6~9	6~9	6~9	6~9	6~9	6~9
加熱減量 (%)	4~7	4~7	4~7	4~6	4~6	4~6
SiO <sub>2</sub> (%)	81~85	80~84	81~85	84~88	84~88	84~88
CaO (%)	0.2以下	0.2以下	0.2以下	0.1以下	0.1以下	0.1以下
Fe <sub>2</sub> O <sub>3</sub> (%)	0.1以下	0.1以下	0.1以下	0.05以下	0.05以下	0.05以下
Al <sub>2</sub> O <sub>3</sub> (%)	1.0以下	1.0以下	1.0以下	0.5以下	0.5以下	0.5以下
Na <sub>2</sub> O (%)	4.0以下	4.0以下	4.0以下	1.0以下	1.0以下	1.0以下

※ 包装時水分値